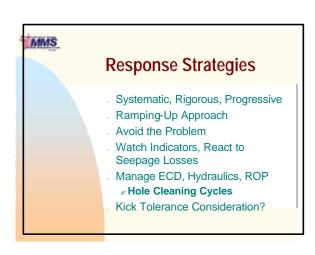
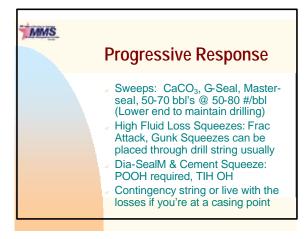
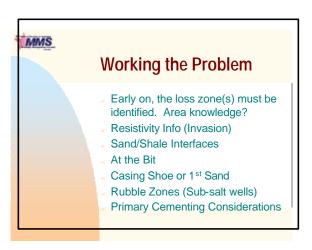
LOC Control Techniques Techniques to Control Lost Circulation in Drilling Through Under-Saturated, HighPermeability Formations Steve Walls

What's the Problem? Producing formations depleted from virgin pressures Wellbore stability, casing string designs may cause problem Trapped pressures in source rock require high MWs; lead to very high overbalances & Delta P Weakened rock matrices Synthetic Oil Based Muds

Problem Magnitude Losses may be almost inevitable Once begun, LOC very difficult to cure when drilling with SBM Typically, losses > 25 bbl/hr require a response from rig team @ \$300/bbl, this could lead to a \$180,000 mud loss in 24 hours Sen. Dirksen from Illinois







MMS

Moving On

- After spotting pills, pull up, circ to ensure drill string is unplugged and free and monitor losses for 3-4 hours while well heals (and LCM migrates into position)
- If squeezing, use a 5-minute hesitation squeeze technique with no more than 50 psi increase per squeeze increment. Max 250-300

MMS

Continue to Monitor

- When LOC is healed, it's usually a temporary fix, except in the case of Dia-SealM & cement squeezes
- Monitor returns at all times and be aware of positions of drill string tools such as stabilizers and bit
- If LOC occurs again, determine immediately if it's a new zone or the problem you just fixed

MMS

Important Considerations

- Care and feeding of the reservoir
- Rock matrix is under-strength, in the case of prior depletion
- Use Risk Management matrix to systematically determine the proper response level
- DO NOT PRE-TREAT!
 - ∠ Causes the problem you're trying to avoid

MMS

Summary Points

- Lost Circulation, particularly in SBM, can quickly add up to the loss of hundreds of thousands of dollars + severe reservoir damage
- Anticipate the problem (logistics)
- Systematic Response
- Intelligent Drilling with all the relevant data points, ECDs, a patient approach to solutions